INSTRUCTION BOOK

FOR W&T EQUIPMENT

WALLACE & TIERNAN

WALLACE & TIERNAN, INC.
25 MAIN STREET • BELLEVILLE, NJ 07109-3057

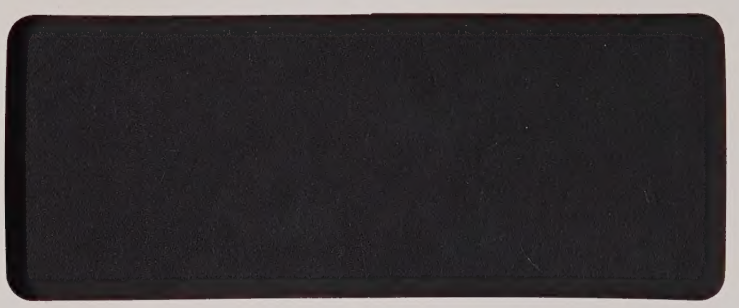
PLEASE NOTE: THIS EQUIPMENT HAS BEEN DESIGNED TO PROVIDE RELIABLE SERVICE; HOWEVER, BEFORE ATTEMPTING TO INSTALL, OPERATE, OR SERVICE THE EQUIPMENT, THIS INSTRUCTION BOOK MUST BE READ, UNDERSTOOD, AND OBSERVED. FAILURE TO DO SO CAN RESULT IN IMPROPER OPERATION WITH POSSIBLY HAZARDOUS CONSEQUENCES.

EQUIPMENT SERIAL NO. _____

DATE OF START-UP _____

START-UP BY _____

Prompt service available from branch offices in principal cities.



ORDERING INFORMATION

In order for us to fill your order immediately and correctly, please order material by description and part number, as shown in this book. Also, please specify the serial number of the equipment on which the parts will be installed.

GUARANTEE AND WARRANTY

Seller warrants for a period of one year after shipment that the equipment or material of its manufacture is free from defects in workmanship and materials, but its liability for any breach of this warranty is limited to the replacement f.o.b. shipping point of the defective parts. No action for breach of warranty shall be brought more than one year after the cause of action has accrued. Corrosion or other decomposition by chemical action is specifically excluded as a defect covered hereunder, except that this exclusion shall not apply to chlorination equipment. **SELLER MAKES NO OTHER WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OR MERCHANTABILITY OR OF FITNESS OF THE MATERIAL OR EQUIPMENT FOR ANY PARTICULAR PURPOSE EVEN IF THAT PURPOSE OR IS KNOWN TO SELLER.** Seller shall not be liable for any incidental or consequential damages arising from the sale or use of the equipment or material. Where circumstances permit, Seller will invoke, for the benefit of Buyer, the guarantee or warranty of Seller's vendor for equipment or materials furnished hereunder. In the event the equipment or material furnished hereunder shall be used in any capacity in connection with any nuclear facility, Buyer agrees to hold Seller harmless from all claims for damages arising out of injury or death to any person or damage to or destruction of the nuclear facility, or any other property, or loss of use of any such property, whether such person or property is on or off the installation or activity site for which the equipment or material furnished hereunder is destined and whether such damage, loss, destruction or loss of use, injury or death results directly or indirectly from a nuclear incident or from any other cause.

Statements and instructions set forth herein are based upon the best information and practices known to Wallace & Tiernan, Inc., but it should not be assumed that every acceptable safety procedure is contained herein. Of necessity this company cannot guarantee that actions in accordance with such statements and instructions will result in the complete elimination of hazards and it assumes no liability for accidents that may occur.

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TP-83-PX (REV. 6-89)

PORTABLE
PNEUMATIC CALIBRATOR

SERIES 65-120

BOOK NO. WBA 650.120 ISSUE A

W&T WATER AND WASTE TREATMENT EQUIPMENT

V-notch Chlorinators from the low-capacity, manual V-100 to the wall-mounted V-500 and modular V-2000 with state-of-the-art controllers that make them ideal for Flow-proportional, Direct-residual, and Compound-loop Control. Micro/2000™ Analyzer features unparalleled stability and sensitivity with "smart" micro-processor-based electronics. It allows continuous residual control down to 10 ppb, brings a new dimension to dechlorination. Chlorine dioxide systems for disinfection where THM's are a problem. W&T Slakers give efficient lime slaking on-site. Other equipment applies polymers for focculation, ammonia for chloramine disinfection, and sulfur dioxide for dechlorination. W&T Hypochlorinators, in a variety of capacities, are stocked by distributors nationwide.

VAREA-METERS AND PURGE METERS

Glass-tube purge meters feature one-piece stainless or KYNAR® vinylidene fluoride resin frames. Glass-tube Varea-meter is available in a variety of wetted materials. Metal-tube, PVC-tube, or TFE-lined Varea-meters offer a choice for high temperature and pressure metering of corrosive fluids. The latter available with flow switch and/or pneumatic or electronic flow rate transmitters. W&T Armored Purge Meters include an all-stainless model for high temperatures and pressures and the state-of-the-art ARMA-VIEW™ Meter with highly visible dial readout and convenient in-line servicing.

METERING PUMPS

W&T Plunger Pumps for high pressure applications include Series 150A with single or double liquid ends and Series 200A in simplex, duplex, or triplex. CHEMFRAM™ Piston-diaphragm Pumps are also available in simplex, duplex, and triplex. They feature a double TFE diaphragm hydraulically actuated and balanced for maximum operating life and chemical resistance, minimum wear. W&T's tubular-diaphragm pumps are the CHEMTUBE® Pump for industrial processes and the ENVIROTUBE™ Pump for water and waste treatment. They feature state-of-the-art tubular-diaphragm technology for reliable chemical metering. 44 Series Diaphragm Pumps give precise metering to 5000 gpd; feature pumping heads for mild chemicals, aggressive chemicals and slurries. W&T CHEMPULSE™ Pumps are rugged and economical solenoid pumps featuring state-of-the-art electronics, pumping heads for mild to aggressive chemicals, and capacities of 1, 5, and 10 gph. W&T Metering Pumps offer manual or automatic control and a selection of accessories such as: Pressure-relief, backpressure, and anti-syphon valves; main connections; solution tanks; and pump-tank chemical metering systems.

DRY CHEMICAL FEEDERS AND WEIGHERS

W&T Mechanical Weighbelt Feeder is low-cost, durable, available with manual, rotary-inlet (for floodable materials), or variable-speed control. The latter can have digital feedrate readout and automatic control by mA input. W&T Digital Weighbelt Feeders feature programmable microprocessor control and selection of software. Available in manual-vertical-gate and rotary-inlet models and with electrical ratings from general purpose to FM approved for hazardous locations. Accepts mA and frequency control inputs; generates flow-proportional frequency or mA output. Accuracies to 0.25% of set rate; continuous operating ranges to 200:1; automatic belt tracking and tensioning.

W&T Digital Weighbelt Meters, similar to above feeder, generate an mA or frequency output proportional to flow through the meter.

ISCAFLO® Systems are solids-handling systems for food, milling, and chemical-processing. They consist of an on-line weighing scale and a microprocessor control-and-monitoring station. They are available in types which: weigh and control material in a single-process stream; retain a 15-line formula in memory for repeat batch production; provide yield management of 15 process streams.

W&T also offers a rugged belt-type volumetric feeder with capacities to 45 cubic feet per minute and manual or automatic control modes.

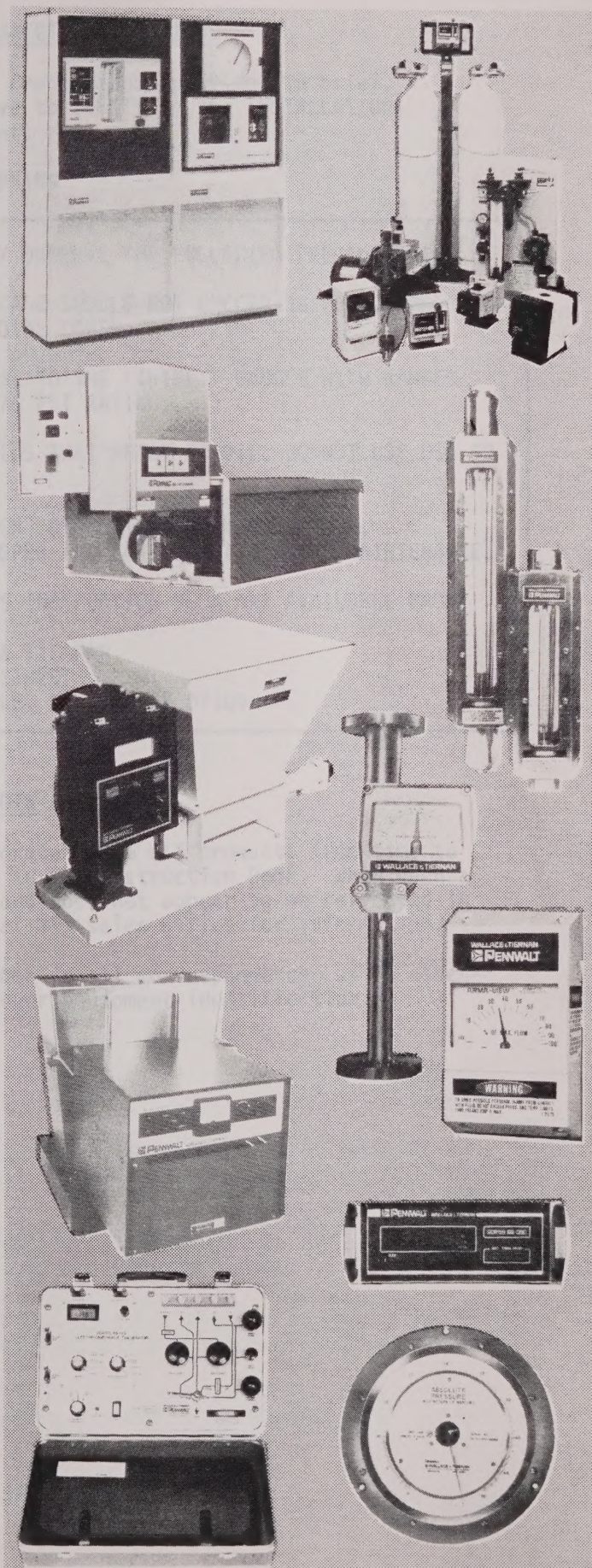
W&T Screw-Type Volumetric Feeders include a water-and-waste treatment model with chemical-resistant fiber glass hopper and a variety of control modes. W&T's industrial-type screw feeder is a rugged all-steel unit with capacities to 500 cubic feet per hour. It is available in a general purpose model, a model for difficult-to-feed materials, and an all-stainless, quick-clean sanitary model.

PRECISION PRESSURE GAUGES

W&T Dial Gauges come in models for absolute, gauge, and differential pressure; in many ranges (0-4 to 0-10000 psi) including vacuum and compound ranges; in dial diameters from 2¾" to 8½"; and accuracies from 0.33% to 0.066% fs. W&T Digital Pressure Gauges are compact; measure absolute, gauge, or differential pressure; offer standard ranges between 0-5 and 0-900 psi in several calibration units, accuracies of 0.1% or 0.05% fs, and several digital and analog output signals.

W&T CORROSION CONTROL

W&T designs, installs, and maintains cathodic protection systems for controlling corrosion of water-storage tanks and water-and-waste-treatment structures. MICRO-POLATROL™ Power Units are microprocessor-controlled and modem compatible; they automate cathodic protection. W&T Icing-tank Systems, with patented XL® Anode Assemblies, make cathodic protection systems in icing tanks virtually impervious to ice damage. PLATINEX® Anodes (platinum-niobium) give reliable, long-life protection and worthwhile economies in corrosion control.



VERY IMPORTANT SAFETY PRECAUTIONS

This page titled "Very Important Safety Precautions" provides in brief, information of urgent importance relative to SAFETY in the INSTALLATION-OPERATION & MAINTENANCE of this equipment.

WARNING

TO AVOID POSSIBLE SEVERE PERSONAL INJURY OBSERVE THE FOLLOWING PRECAUTIONS:

THE PRESSURE APPLIED TO THE INSTRUMENT CASE SHOULD NOT EXCEED 35 PSIG. PRESSURE ABOVE THIS LEVEL CAN RUPTURE THE GLASS DIAL COVER.

DO NOT APPLY PRESSURE IN EXCESS OF 90 PSI TO THE FILTER. GAUGES WITH RANGES ABOVE 30 PSI MUST USE A FILTER WITH A 175 PSI RATING.

FOR GAUGE USED WITH OXYGEN OR OTHER FLUIDS THAT REACT TO OIL, DO NOT USE OIL TO MOISTEN FILTER WHEN CLEANING.

DO NOT DISCARD THIS INSTRUCTION BOOK UPON COMPLETION OF INSTALLATION. INFORMATION PROVIDED IS ESSENTIAL TO PROPER AND SAFE OPERATION AND MAINTENANCE.

ADDITIONAL OR REPLACEMENT COPIES OF THIS INSTRUCTION BOOK ARE AVAILABLE FROM:

WALLACE & TIERNAN
25 MAIN STREET
BELLEVILLE, NEW JERSEY 07109

NOTE

Minor part number changes may be incorporated into W&T products from time to time that are not immediately reflected in the Instruction Book. When such a change has been made in your equipment and does not appear to be reflected in your Instruction Book, contact your local W&T sales office for information.

Please include the equipment serial number in all correspondence, as is essential for effective communication and proper equipment identification.

PORTABLE PNEUMATIC CALIBRATOR

DESCRIPTION

This Instruction Book describes installation, operation and maintenance instructions for the Wallace & Tiernan (W&T) Series 65-120 Portable Pneumatic Calibrator. This equipment is designed primarily for field checking and calibration of pneumatic controls and instrumentation. In most cases the gauge, recorder or other pneumatic device being checked need not be removed from its mounting or operating location.

WARNING: TO AVOID POSSIBLE SEVERE PERSONAL INJURY OR DAMAGE TO THE EQUIPMENT THROUGH MISUSE, THIS EQUIPMENT SHOULD BE INSTALLED, OPERATED AND SERVICED ONLY BY TRAINED, QUALIFIED PERSONNEL WHO ARE THOROUGHLY FAMILIAR WITH THE ENTIRE CONTENTS OF THIS INSTRUCTION BOOK.

The Series 65-120 Calibrator consists of a carrying case containing an aluminum panel on which are mounted a precision pressure gauge, a selector valve, two precision pressure regulators, an air filter, and a connection block. A graphic flow diagram on the panel shows clearly all connections between the various units.

WARNING: IMPROPER USE OF THIS GAUGE MAY CAUSE EXPLOSION AND PERSONAL INJURY. READ INSTRUCTION BOOK BEFORE USING THIS EQUIPMENT.

The following general and safety related information on the installation and use of pressure gauges has been excerpted from ANSI B40.1-1974, GAUGES PRESSURES & VACUUM - indicating Dial Type - Elastic Element. The complete standard may be obtained from the AMERICAL SOCIETY OF MECHANICAL ENGINEERS, United Engineering Center, 345 East 47th St., New York, N.Y. 10017.

2.0 DEFINITIONS

2.1 Basic Gauge Classifications

2.1.1 Pressure Gauge. A gauge to measure and indicate pressure greater than ambient* using ambient pressure as the datum point.

2.1.2 Vacuum Gauge. A gauge to measure and indicate pressure less than ambient* using ambient pressure as the datum point.

2.1.3 Compound Gauge. A gauge to measure and indicate pressure both greater than and less than ambient* using ambient pressure as the datum point.

2.1.4 Absolute Pressure Gauge. A gauge to measure and indicate pressure above zero absolute pressure, using absolute zero pressure as the datum point.

2.1.5 Single Gauge. A gauge having one elastic element, one connection, and a means of measure and indicate one pressure or vacuum.

2.1.6 Duplex Gauge. A gauge having two independent elastic elements, two independent connections and a means to measure and indicate two independent pressure or vacuum.

*Ambient pressure is the pressure surrounding the measuring element.

2.1.7 Differential Gauge. A gauge having two connections and a means to measure and indicate the difference between the two pressures.

2.3 Application Conditions (see Section 4.0)

2.3.6 Overpressure. The application of a pressure beyond the full scale pressure.

NOTE: Overpressure should be avoided since it can cause calibration change, damage to the elastic element and gauge failure.

3.2 Operating Parameters

3.2.3 Caution to Users. Pressure gauges can be rendered inaccurate during shipment despite care taken in packaging. To insure conformance to the (standards) to which the pressure gauge was manufactured, it should be checked before use.

4.0 SAFETY

4.1 Scope

This section of the standard presents information to guide users, suppliers and manufacturers toward minimizing the hazards that could result from misuse or misapplication of pressure gauges with elastic elements.

Adequate safety results from intelligent planning and careful selection and installation of gauges into a pressure system. The user should inform the supplier of all conditions pertinent to the application and environment so that the supplier can recommend the most suitable gauge for application.

4.2 General Comments

4.2.1 The history of safety with respect to the use of pressure gauges has been excellent. Injury to personnel and damage to property have been minimal. In most instances, the cause of failure has been misuse or misapplication.

4.2.2 The pressure sensing element in most gauges is subjected to high internal stresses, and applications exist where the possibility of catastrophic failure is present. Pressure regulators, chemical seals, pulsation dampers or snubbers, syphons, etc., are available for use in these potentially hazardous systems.

4.2.3 Pressures in excess of full scale pressure (or vacuum) should not be applied unless recommended by the gauge manufacturer.

4.2.4 The window material alone will not provide adequate protection against internal case pressure build-up and can, in fact, be the most hazardous component.

4.2.5 The following systems are considered potentially hazardous and must be carefully evaluated:

1. Compressed gas systems
2. Oxygen systems
3. Systems containing hydrogen or free hydrogen atoms
4. Corrosive fluid systems (gas and liquid)
5. Pressure systems containing any explosive or flammable mixture or medium.
6. Steam systems
7. Non-steady pressure systems
8. Systems where high overpressure could be accidentally applied.
9. Systems where interchangeability of gauges could result in hazardous internal contamination or where lower pressure gauges could be installed in higher pressure systems.
10. Systems containing radioactive or toxic fluids.
11. Systems installed in a hazardous environment (see Appendix II, paragraph C).

4.2.6 When gauges are to be used in contact with media having known or uncertain corrosive effects or known to be radioactive, random or unique destructive phenomena can occur. In such cases the user should always furnish the supplier or manufacturer with information relative to the application and solicit his advice prior to installation of the gauge.

4.2.7 Fires and explosion within a pressure system can cause pressure element failure with very violent effects, even to the point of completely disintegrating or melting the pressure gauge. Violent effects are also produced when failure occurs due to (1) hydrogen embrittlement, (2) contamination of a compressed gas, (3) formation of acetylides, (4) melting of soft solder joints by steam or other heat sources, (5) corrosion, (6) fatigue, (7) the presence of shock, and (8) excessive vibration. Nearly any failure in a compressed gas system produces violent effects.

4.4.2 Pressure Element

4.4.2.2 Pressure element assemblies are usually joined by soft soldering, silver brazing, or welding. When pressure element joints will be subjected to installed operational temperatures in excess of the values listed below, the user shall furnish detailed information relative to the application and solicit the advice of the gauge supplier prior to its installation.

Soft Soldered	-20°F to +120°F
Silver Brazed	-20°F to +250°F
Welded	-20°F to temperature limits of metals being used.

End of Excerpt of ANSI B40.1-1974

1 Pressure Gauge

The gauge has an accuracy of 1 part in 1000 of full scale range. The gauge has a dual scale with ranges from -100 inches of water to +850

inches of water and -3.6 psi to 30.6 psi. Other gauges with ranges to 100 psi are also available.

WARNING: TO AVOID POSSIBLE SEVERE PERSONAL INJURY THE PRESSURE APPLIED TO THE INSTRUMENT CASE SHOULD NOT EXCEED 35 PSIG. PRESSURE ABOVE THIS MAY RUPTURE THE GLASS DIAL COVER.

2 Selector Valve

The selector valve permits only one of any three pressures to be applied to the pressure connection in the gauge. A fourth position permits venting pressure from the gauge to atmosphere.

3 Air Filter

The air filter mounted under the panel is easily replaceable and protects the various components if the air supply is of less than instrument air quality.

WARNING: TO AVOID POSSIBLE SEVERE PERSONAL INJURY, DO NOT APPLY PRESSURE IN EXCESS OF 90 PSI TO THE FILTER. GAUGES WITH RANGES ABOVE 30 PSI MUST USE A FILTER WITH A 175 PSI RATING.

4 Precision Pressure Regulators

The two precision pressure regulators accept supply air pressure through the filter and regulate the output. These are used in applying known pressures to pneumatic control devices.

5 Accessories

Furnished with the calibrator are six connectors P52409 and six nuts P34439 for 1/8-inch pipe thread to 1/4-inch OD plastic tubing and 20 feet of 1/4-inch OD plastic tubing RP68-4441.

6 Case

The lid of the carrying case may be removed for convenience.

CARE OF INSTRUMENT

This calibrator is a precision instrument. It has been just as ruggedly constructed as the service for which it is intended will permit, and every precaution has been taken to prevent it getting out of adjustment when subjected to vibration and shock. In an instrument as sensitive as this, delicate parts must be used. In view of this, the instrument should be handled with care and protected against violent and sudden jolts.

This instrument mechanism does not require oil.

This instrument is intended for use with dry non-corrosive gas.

OPERATION OF INSTRUMENT

Exercising

When using an aneroid indicator for precise calibrating purposes, due consideration must be given to the effect of hysteresis. Before using this instrument, apply pressure to the full range, allow to remain two minutes and then release allowing the pointer to return to zero. This exercising procedure minimizes the hysteresis effect. Repeat twice. Note that the instrument is calibrated on increasing pressure.

Reading

There is a label on the panel which indicates whether the instrument should be read with the dial horizontal or vertical. However, because the mechanism is carefully balanced, position error may be neglected except when very precise calibrating work is being done. This slight position error may be easily determined by reading the instrument in both positions and noting the difference. To eliminate parallax and read the instrument correctly, place the eye so that the pointer and its image coincide.

Calibrating Adjustment

Note that the accuracy tolerance is the same at all points on the scale. Therefore, the pointer of a gauge pressure instrument is not necessarily at an exact zero when the instrument is shipped from the factory. However, the deviation is never outside the guaranteed accuracy as shown in the table PERFORMANCE CAPABILITY.

A label affixed to the panel indicates the deviation from zero when the instrument was adjusted to attain optimum accuracy over the full scale. This figure was obtained after the instrument was exercised as described in first paragraph above: Exercising.

If, after the instrument has been exercised, the pointer deviation is as specified, no adjustment is necessary. A slight discrepancy may be corrected by adjusting the pointer as described below.

A complete check of calibration of an instrument requires that it be exercised as above and compared with a standard having verified accuracy at least five times greater and a scale comparable in length to the instrument being checked. The standard must be corrected for all its inherent errors and must be corrected to standard conditions of gravity (980.665 cm/sec^2) and temperature (0°C for mercury columns or 20°C for water columns) where applicable.

While aneroid instruments are not subject to changes in reading due to gravity, they are affected by temperature. W&T instrument read directly in terms of standard conditions (see preceding paragraph) at the temperature 25°C unless otherwise indicated. If the calibration check is conducted at 25°C, the effect of temperature on the W&T instrument need not be considered. At any other temperature, the temperature effect listed in the table PERFORMANCE CAPABILITY must be considered. Note that this is not a correction factor but, rather, a tolerance that must be added to other tolerance being checked. When readings are taken on increasing pressures, they should fall within the specified accuracy

tolerance given in the table. The difference between the upscale reading and the down-scale reading is the hysteresis error and should fall within the specified limits.

Setting the Pointer

If a calibration check shows the readings on increasing Pressures at various points over the entire range are out by the same angular distance, the pointer may be reset. Adjustment is limited to a pointer movement of about 10 degrees.

Access to the pointer adjustment screw is obtained by removing a plug in the back of the case.

If the error is not linear and cannot be corrected with a simple pointer adjustment, the gauge should be returned to the factory for repair and/or recalibration.

W&T maintains a fully equipped service center staffed with trained personnel to repair, recalibrate and recertify W&T pressure instruments.

W&T Instruction Book WAA 600.000 specifies in detail definitions, pressure standards, performance capability, calibration procedures and adjustments applicable to W&T instruments. This book, available on request, is intended to assist those who wish to conduct their own calibration tests.

Precautions

A. Do not subject the instrument to pressure beyond its range. This can easily be controlled by proper setting of the air regulator. A pressure relief valve (36, 37 or 43) has been installed to protect the mechanism in the event of an air regulator failure. These relief valves are set to relieve at approximately 15% above full scale and will protect the mechanism for overpressure up to three times full scale range.

B. Unless wide temperature changes are experienced, the effect of temperature may be neglected. Therefore, do not install the instrument near a source of heat or cold. Temperature allowance equals 0.1 percent of full scale per 10° Centigrade change from calibration temperature of 25°C. Temperature allowance represents the maximum possible error due to temperature. Because the actual error is usually much less, temperature allowance is not a correction factor.

C. DO NOT use for liquid service.

WARNING: TO AVOID POSSIBLE SEVERE PERSONAL INJURY DO NOT APPLY PRESSURE GREATER THAN THE MAXIMUM CASE PRESSURE. THE MAXIMUM PRESSURE WHICH MAY SAFELY BE APPLIED TO THE INSTRUMENT CASE IS 35 PSIG. ("S" CONNECTION) A RELIEF VALVE ON THE GAUGE CASE WILL PROTECT THE CASE FROM APPLIED PRESSURE UP TO 10 TIMES THE MAXIMUM CASE PRESSURE RATING. HOWEVER, THIS VALVE IS AN EMERGENCY-PROTECTIVE DEVICE ONLY. PRECAUTIONS MUST BE TAKEN NOT TO APPLY PRESSURE GREATER THAN THE MAXIMUM CASE PRESSURE.

Operation

The details of some typical uses of the Portable Pneumatic Calibrator are given below.

A. Measurement of Pressure from External Sources

1. Connect the unknown pressure to connection marked P3. Leave S open to atmosphere.
2. Turn selector valve to position P3 and read the pressure on calibrator.

NOTE: For vacuum greater than 100 inches of water connect to S and leave P3 open to atmosphere.

B. Calibration of Pressure Gauges With Air

1. Connect AIR SUPPLY to a source of air pressure from zero to 90 psig.
2. Connect gauge to P1 or P2 with flexible tubing or, if gauge is small enough and has 1/8-inch NPT male thread, screw gauge directly into connection block at P1 or P2.
3. Turn handle of appropriate regulator counter-clockwise until spring in regulator is completely relaxed.
4. Turn handle of selector valve to appropriate position.
5. Turn on air supply, adjust pressure to desired value with regulator and compare gauge reading with calibrator reading.

C. Calibration of Pneumatic Recorders or Indicators

1. Connect air supply and recorder or indicator as in paragraph B1 or 2 above.
2. Proceed as in paragraph B3, 4 and 5 comparing recorder pen reading or indicator pointer reading with calibrator reading.

D. Measurement of Pressure Differentials from External Sources

1. Connect higher of two pressures to P3.
2. Turn selector valve handle to position P3.
3. Apply lower of two pressure to "S" and read difference in pressure on calibrator.
4. If two or three unknown pressures are to be compared to a reference pressure, the reference pressure would be connected to S, unless it is possible that the reference pressure can be more than 1 psi greater than one of the other pressures.
5. Assuming that the reference pressure is lower than the unknown pressures, the unknowns are connected one at a time to P3.
6. Apply one unknown pressure to the calibrator.
7. Turn on or apply reference pressure to "S" and read the difference on the calibrator.

CAUTION: Decrease reference pressure to zero or shut it off before shutting off or disconnecting pressure connection on P3.

E. Calibration of Pneumatic Controller in Which Applied Set and Variable Pressures Result in an Output Pressure Which is a Function on the Other Two Pressures.

1. Connect AIR SUPPLY to a source of air pressure not exceeding 90 psig.
2. Connect P1 to SET pressure connection on control device.
3. Connect P2 to PROCESS VARIABLE pressure connection on control device.
4. Connect OUTPUT connection on control device to P3.
5. Turn regulator handles counter-clockwise until spring in regulator is completely relaxed.
6. Turn on air supply.
7. Turn selector valve to position P1 and adjust Regulator 1 until SET pressure read on calibrator is value required by the particular device.
8. Turn selector valve to position P2 and using Regulator 2 set the PROCESS VARIABLE at some value near one end of the variable pressure range.
9. Turn selector valve to P3 and read the OUTPUT pressure resulting from action of P1 and P2 on controller.
10. Repeat Steps 8 and 9, as many times as desired to cover the range of PROCESS VARIABLE pressure.

F. Adjustment of Any Pneumatic Device in Which the Difference Between Two Signals Should Be Zero or Some Value Not Exceeding the Range of the Calibrator

1. Connect the two signals to P3 and S respectively with the higher pressure on P3.
2. Turn selector valve to P3.
3. Turn on the two signals simultaneously if possible. Otherwise turn on P3 first.

WARNING: THE SIGNAL APPLIED TO S CONNECTION MUST NOT EXCEED 35 PSI.

G. Measurement of Absolute Pressure

1. Connect vacuum pump to S and evacuate case. The gauge pointer will indicate pressure below atmosphere (vacuum) when the case has been evacuated.
2. Connect pressure to be measured to P3.
3. Turn selector valve to P3 and read absolute pressure.

NOTE: Additional absolute pressures may be measured at P1 and P2 if the regulators are by-passed with the tubing furnished.

H. Calibrating of Vacuum Gauges

1. Set selector valve to P3 and leave connection P3 open to atmosphere.
2. Install a tee in S connection and connect one leg to a vacuum source and the other to the gauges which are to be calibrated.
3. Install a shut-off valve at vacuum source. Tee into the line between this shut-off valve and the calibrator with a bleed valve.
4. Compare calibrator readings with the vacuum gauge readings.

SERVICE NOTES

Precision Pressure Regulator

The regulator is a Model H-10-T purchased as a unit from Conoflow Corp. Wallace & Tiernan does not stock parts for this regulator and if any are needed, the manufacturer should be consulted. Be sure to specify the range as stamped on the bottom of the regulator.

Air Filter

Replace air filter U28021 or FU4969 at regular intervals depending on the quality of the air supply and the frequency with which the calibrator is used. See label L1809 on Dwg. 650.120.150.020 for recommendations.

Precision Pressure Gauge

Filter: Each instrument is furnished with a filter screwed into the pressure connections. The filter screen may occasionally require cleaning. This may be done as follows:

1. Remove the 1/8" NPT to 1/4" tube elbows screwed into the gauge case pressure connections.
2. Unscrew the filter plug.
3. Clean the filter with 1,1,1, - trichloroethane or other suitable solvent. Replace the filter.
4. If the case orifice is plugged, remove the gauge mechanism from the case and clear orifice with a small diameter wire after unsoldering tubing from case connection.

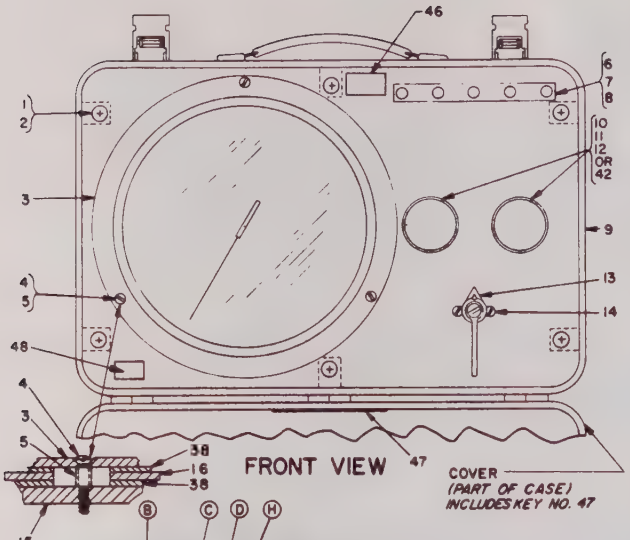
Lubrication: The mechanism does not require oil. The oil will interfere with proper functioning and introduce serious errors. DO NOT OIL THE MECHANISM.

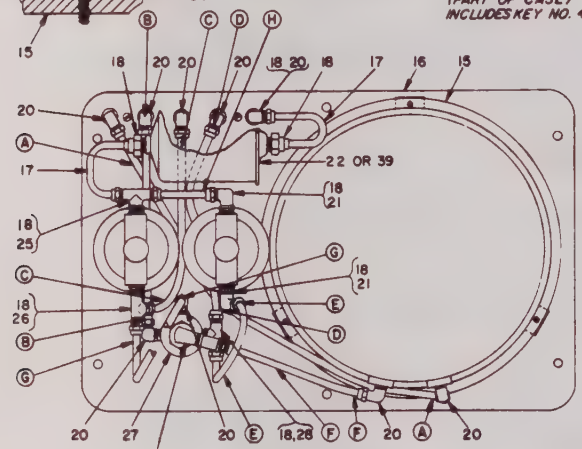
PERFORMANCE CAPABILITY

SERIES	ACCURACY (1)	SENSITIVITY (1)	HYSTERESIS (1)	MAX. TEMP. EFFECT (2)
1500	0.066	0.01	0.1	0.1
1000	0.1	0.01	0.1	0.1
300	0.33	0.2	———	———

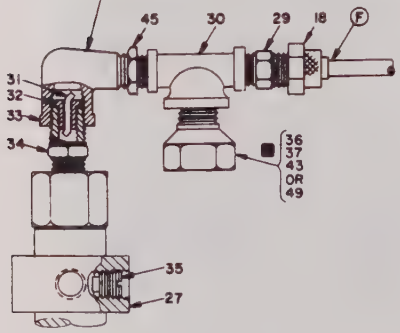
(1) %Full Scale. Full Scale is the difference between minimum and maximum dial reading. Full Scale of an instrument with a calibrated range of 0 to 800mm Hg is 800 Hg where as Full Scale of an instrument with a calibrated range of 390 to 800 mm is 410 mm Hg.

(2) %Full Scale per 10°C from 25°C.





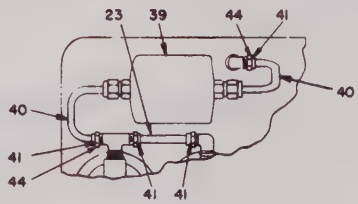
REAR VIEW



ENLARGED VIEW

KEY NO.	PART NO.	QTY.	DESCRIPTION	FULL SCALE PRESSURE
1	P 43283	6	MACH.SCREW (TRUSS HD.,S.S.) 1/4"-20x1/2"LG.	5 PSI TO 30.6 PSI / 130" TO 850" H_2O / 0 TO 125 H_2O / 61 TO 100 PSI / 31 TO 60 PSI
2	P 56002	6	SPEED NUT (TYPE "J") 1/4"-20	
3	———	1	GAUGE (NOT PART OF ASSEMBLY)	
4	PN 4917	3	MACH.SCREW (OVAL HD.,BRASS)#8-32 x 1" LG.	
5	P 47333	3	SPACER	
6	FP 9923	1	AIR CONNECTION MANIFOLD	
7	PN 6938	2	MACH.SCREW(RD.HD.,BRASS)#10-32 x 7/16"LG.	
8	P 13619	2	#10 LOCKWASHER (S.S.)	
9	FU 4876	1	CASE	
10	U 18713	2	AIR REGULATOR (0 TO 30 P.S.I.)	
11	UXA 18713	2	AIR REGULATOR (0 TO 5 P.S.I.)	
12	UXB 18713	2	AIR REGULATOR (0 TO 60 P.S.I.)	
13	———	1	POINTER(PART OF KEY NO. 27)	
14	PN 3774	2	MACH.SCREW(FLAT HD.BRASS) #8-32 x 3/8"LG.	
15	FP 9924	1	BRACKET RING	
16	FP 9925	1	PANEL	
17	FP 10343	2	TUBE	
18	P 34439	19	NUT AND PLASTIC SLEEVE	
20	P 52410	9	90° ELBOW, 1/8" PIPE x 1/4" TUBE	
21	P 52413	2	90° ELBOW, 1/4" PIPE x 1/4" TUBE	
22	U 28021	1	AIR FILTER UNIT (GAUGES 0 TO 30 P.S.I.)	
23	FP 9920	1	TUBE	
25	P 52414	1	TEE, 1/4"TUBE x 1/4"TUBE x 1/4"PIPE	
26	P 52407	1	TEE, 1/4"TUBE x 1/4"PIPE x 1/4"TUBE	
27	U 20030	1	SHUT-OFF VALVE (4 WAY)	
28	P 52411	1	TEE, 1/4"TUBE x 1/4"TUBE x 1/8"PIPE	
29	P 52412	1	HALF UNION, 1/4"PIPE x 1/4"TUBE	
30	P 49289	1	TEE,1/8"PIPE x 1/8"PIPE x 1/4"PIPE	
31	HC68 2080	1/2"LG.	#18 GAUGE COPPER WIRE	
32	PXA 38519	1	RESTRICTOR	
33	P 42329	1	1/8" STREET ELBOW	
34	P 47942	1	ADAPTER	
35	FU 3523	1	FILTER	
36	FU 4620	1	RELIEF VALVE (30 P.S.I)	
37	FU 4909	1	RELIEF VALVE (5 P.S.I)	
38	RK44 5005	3	RUBBER CHANNEL - 9-1/2"LG. EACH	
●39	FU 4969	1	AIR FILTER UNIT (GAUGE ABOVE 30 P.S.I.)	
●40	FU 4970	2	TUBE	
●41	P 47766	4	BRASS SLEEVE	
42	UXC 18713	2	AIR REGULATOR (0 TO 100 P.S.I.)	
43	FU 4908	1	RELIEF VALVE (31 TO 60 P.S.I.)	
●44▲	P 34439	2	1/4" COMPRESSION NUT & PLASTIC SLEEVE	
45	P 686	1	REDUCING BUSHING, 1/4"PIPE x 1/8"PIPE	
46	FP 10046	1	SPECIAL INSTRUCTION LABEL	
47	L 1809	1	NOTE LABEL	
48	L 2326	1	WARNING LABEL	
49	FU 4917	1	RELIEF VALVE (61 TO 100 P.S.I.)	

FURNISHED NOT FURNISHED



REAR VIEW
(31 TO 100 PSI FULL SCALE)

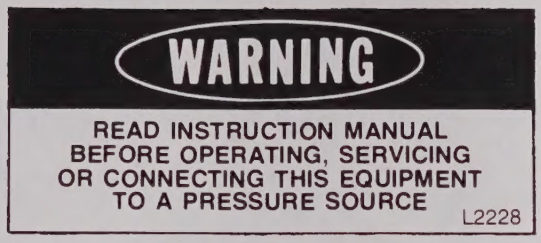
1/4" O.D.PLASTIC TUBING RP68 4441	
KEY LETTER	LENGTH
A	17"
B	7"
C	8"
D	7"
E	8"
F	4"
G	8"
H	2-1/8"

NOTE: ● MAKES UP U23884.
OVERALL DIMENSIONS: 18" x 7" x 12-1/2".
■ ADJUST TO 115% OF FULL SCALE PRESSURE.
▲ REPLACE PLASTIC SLEEVE WITH BRASS SLEEVE P47766.
WHEN ORDERING MATERIAL ALWAYS SPECIFY MODEL AND SERIAL NUMBER OF APPARATUS

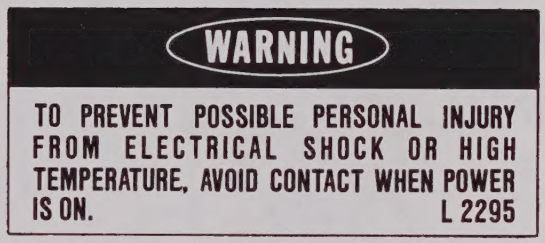
SERIES 65-120 PORTABLE PNEUMATIC CALIBRATOR - PARTS

WALLACE & TIERNAN
25 MAIN STREET, BELLEVILLE, NEW JERSEY 07109-3057

650.120.000.011
ISSUE 13 5-89



L 2228



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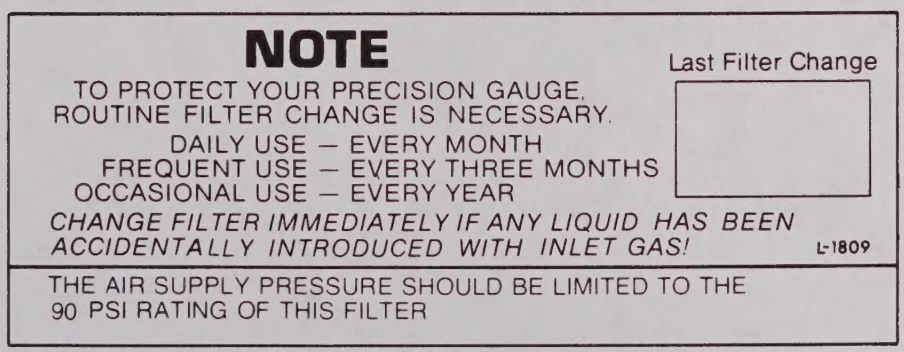
NOTE
Last Filter Change
TO PROTECT YOUR PRECISION GAUGE,
ROUTINE FILTER CHANGE IS NECESSARY.
DAILY USE — EVERY MONTH
FREQUENT USE — EVERY THREE MONTHS
OCCASIONAL USE — EVERY YEAR
CHANGE FILTER IMMEDIATELY IF ANY LIQUID HAS BEEN
ACCIDENTALLY INTRODUCED WITH INLET GAS!
L-1809
THE AIR SUPPLY PRESSURE SHOULD BE LIMITED TO THE
90 PSI RATING OF THIS FILTER

L 1809

WHEN ORDERING MATERIAL ALWAYS SPECIFY MODEL AND SERIAL NUMBER OF APPARATUS

MP MASTER
MA22018